REMARKS

Claim 1 has been amended to recite "[a]n enzyme having alcohol and aldehyde dehydrogenase activity comprising an isolated polypeptide encoded by a DNA molecule according to SEQ ID NO: 4 or an isolated polypeptide with at least 90% identity to SEQ ID NO: 8." Support for this amendment is found in the specification at, for example, page 34, line 1 to page 35, line 5; Example 2; and in original claim 1. *See In re Gardner*, 177 USPQ 396, 397 (CCPA 1973) and MPEP §§ 608.01(o) and (l) (8th ed. Rev. 5, August 2006, pp. 600-92 and 600-84).

Claim 2 has been amended to recite "[a]n enzyme of claim 1 having alcohol and aldehyde dehydrogenase activity, wherein the isolated polypeptide is a chimeric polypeptide including a combination of at least two amino acid sequences each of said sequences being selected from the group consisting of SEQ ID NO: 5, SEQ ID NO: 8, and amino acid sequences with at least 90% identity to SEQ ID NO: 5 or SEQ ID NO: 8." Support for this amendment is found in the specification at, for example, page 34, line 1 to page 35, line 5; Example 2; and in original claim 2. (*Id.*).

Claim 30 has been amended to recite "[a]n isolated enzyme having alcohol and aldehyde dehydrogenase activity encoded by a recombinant expression vector comprising a DNA sequence of SEQ ID NO: 4 or a DNA sequence which encodes a polypeptide with at least 90% identity to SEQ ID NO: 8, wherein the DNA sequence is functionally linked to one or more genetic control sequences and is capable of expression of an enzyme including at least one recombinant polypeptide having alcohol and aldehyde dehydrogenase activity." Support for this amendment is found in the specification at, for example, page 34, line 1 to page 35, line 5; Example 2; and in original claim 30. (*Id.*).

Claim 31 has been amended to recite "[a]n isolated enzyme having alcohol and aldehyde dehydrogenase activity encoded by a recombinant expression vector comprising a DNA sequence of SEQ ID NO: 4 or a DNA sequence which encodes a polypeptide with at least 90% identity to SEQ ID NO: 8." Support for this amendment is found in the specification at, for example, page 34, line 1 to page 35, line 5; Example 2; and in original claim 31. (*Id.*).

It is submitted that no new matter has been introduced by the foregoing amendments.

35 U.S.C. § 112, Second Paragraph, Rejections:

Claims 1-3, 20-22, 25, and 29-31 have been rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. (Paper No. 20070321 at 2).

In making the rejection, the Examiner asserted that the phrase "hybridizes under stringent conditions" and "stringent washing conditions" renders the claims indefinite. (*Id.*).

With a view towards furthering prosecution, claim 1 (from which claims 2-3, 20-22, 25, 28, and 29 depend), claim 30, and claim 31 have been amended to remove the rejected claim language. In view of the foregoing, this rejection of claims 1-3, 20-22, 25, and 29-31 is rendered moot. Accordingly, withdrawal of the rejection is respectfully requested.

35 U.S.C. § 112, First Paragraph, Rejections:

Claims 1-3, 20-22, 25, 28, and 30-31 have been rejected under 35 U.S.C. § 112, first paragraph, for lack of enablement. (Paper No. 20070321 at 4).

In making the rejection, the Examiner asserted that "the disclosure does not teach the stringent hybridization conditions and stringent washing conditions to be

used in selection of DNA molecules of [the] invention, [and therefore] claims 1-3, 20-22, 25, 28, 30-31 as amended are not enabled and thus rejected." (*Id.* (original emphasis)). The Examiner acknowledged, however, that the specification is "enabling for the alcohol and aldehyde dehydrogenses of SEQ ID NO[s]: 5, 6, 7, and 8, ..." (*Id.*).

Initially, we note that it is the Examiner's burden to demonstrate that a specification is not sufficiently enabling. *In re Marzocchi*, 169 USPQ 367, 369 (CCPA 1971). To carry her burden, the Examiner must identify and clearly articulate the factual bases and supporting evidence that allegedly establish that undue experimentation would be required to carry out the claimed invention. *Id.* at 370.

With a view towards furthering prosecution, claim 1 (from which claims 2-3, 20-22, 25, 28, and 29 depend), claim 30, and claim 31 have been amended to remove the rejected claim language "stringent hybridization and stringent washing conditions."

Claim 1 (from which claims 2-3, 20-22, 25, 28, and 29 depend), claim 30, and claim 31 have been amended to recite amino acid sequences or DNA sequences which encode a polypeptide (1) that contains SEQ ID NO:8 or a sequence that is 90% identical to it and has alcohol and aldehyde dehydrogenase activity (*i.e.*, claims 1, 2, 30 and 31), (2) that contains SEQ ID NOs: 5 or 8 or sequences that are at least 90% identical to SEQ ID NOs: 5 and 8 and that have alcohol and aldehyde dehydrogenase activity (*i.e.*, claim 2), and (3) that contains the polynucleotide sequence of SEQ ID NO: 4 or encodes an amino acid sequence that is at least 90% identical to SEQ ID NO: 8 (*i.e.*, claims 1, 30, and 31).

The specification discloses that the nearest homologues of Enzyme B (SEQ ID NO: 8) exhibit a maximum homology of 26-31% with known enzymes (page 34, line 20 to page 35, line 4):

> Homology search of Enzymes A, A', A" and B revealed that Enzymes A, A', A" and B showed rather low homology (26-31% homology through the polypeptides) with several quino-proteins including alcohol dehydrogenase of *Acetobacter aceti* (T. Inoue et al., J. Bacteriol. 171: 3115-3122) or *Acetobacter polyoxogenes* (T. Tamaki et al., B.B.A., 1088: 292-300), and methanol dehydrogenase of *Paracoccus denitrificans* (N. Harms et al., J. Bacteriol., 169: 3966-3975), *Methylobacterium organophilum* (S.M. Machlin et al., J. Bacteriol., 170: 4739-4747), or *Methylobacterium extorquens* (D.J. Anderson et al., Gene 90: 171-176).

Moreover, Table 7 of the specification details the degree of homology between the AADH (Alcohol/Aldehyde Dehydrogenases) of SEQ ID NO: 8 and three other amino acid sequences having AADH activity, *i.e.*, SEQ ID NOS: 5, 6 and 7, which are disclosed throughout the specification. The results in Table 7 demonstrate that a homology of at least 80% was detected:

Table 7. Homologies of amino acid sequences among AADHs.

	Enzyme A	Enzyme A'	Enzyme A"	Enzyme B
Enzyme A	100			
Enzyme A'	89	100		
Enzyme A"	85	86	100	
Enzyme B	83	82	81	100

(See specification at page 34, lines 15-20). As discussed above, the next highest homology between Enzymes A, A', A", and B to enzymes with known alcohol or methanol dehydrogenase activity was in the range of 26 to 31%. (See Specification at page 34, line 20 to page 35, line 4). Thus, the data in Table 7 clearly provides evidence

that the Applicants enabled the full scope of the amended claims by unambiguously identifying enzymes having highly homologous polypeptide sequences and sharing a common function -- AADH activity.

As is well accepted, even a "considerable amount" of experimentation is permissible if it is merely routine or if the specification provides a reasonable amount of guidance. MPEP § 2164.05 and *In re Wands*, 8 USPQ2d 1400, 1404 (Fed. Cir. 1988). Here, the specification provides ample guidance, both by disclosing the degree of homology between the AADH of SEQ ID NO: 8 and three other amino acid sequences having AADH activity, *i.e.*, SEQ ID NOS: 5, 6 and 7 and by requiring "at least 90% identity to" SEQ ID NO: 8 or to SEQ ID NO: 5 in the currently amended claims. Accordingly, it is respectfully submitted that undue experimentation would not be required to carry out the currently claimed invention. For this additional reason, this rejection should be withdrawn.

Claims 2-3 have also been rejected under 35 U.S.C. § 112, first paragraph, for lack of enablement. (Paper No. 20070321 at 4-5).

In making the rejection, the Examiner asserted that claims 2 and 3 "do[ ] not reasonably provide enablement for an enzyme that comprises a combination of at least two amino acids sequences each of said sequences being selected from the group of SEQ ID NO: 8 and SEQ ID NO: 5 and amino acid sequences encoded by DNA sequences hybridizing under stringent hybridization conditions and stringent washing conditions [to] DNA molecules according to SEQ ID NO:4 or 1." (*Id.* at 5 (original emphasis)). The Examiner, however, acknowledged that claims 2 and 3 are "enabling for the plasmid comprising genes encoding SEQ ID NO: 5 and SEQ ID NO: 8 (plasmids pSSAB201 and pSSBA201)." (*Id.* at 4-5).

With a view towards furthering prosecution, claims 2 and 3 have been amended. Claim 1 (from which claims 2 and 3 depend) has been amended to recite "[a]n enzyme having alcohol and aldehyde dehydrogenase activity comprising an isolated polypeptide encoded by a DNA molecule according to SEQ ID NO: 4 or an isolated polypeptide with at least 90% identity to SEQ ID NO: 8." Claim 2 has also been amended to recite "[a]n enzyme of claim 1 having alcohol and aldehyde dehydrogenase activity, wherein the isolated polypeptide is a chimeric polypeptide including a combination of at least two amino acid sequences each of said sequences being selected from the group consisting of SEQ ID NO: 5, SEQ ID NO: 8, and amino acid sequences with at least 90% identity to SEQ ID NO: 5 or SEQ ID NO: 8."

In view of these amendments, we respectfully submit that the construction of the currently claimed chimeric nucleic acid molecules and polypeptides is enabled and specifically disclosed in the specification at, for example, Examples 14 and 15 and in Figures 2, 3, 4, 7, and 8. The specification also discloses the enzymatic activity of these constructs (*see, e.g.*, Figure 11). Furthermore, the specification discloses in Tables 11 and 12 comparisons of the substrate specificities of the claimed enzymes. In view of the currently amended claims, the extensive disclosure in the specification, as well as the above-identified Tables and drawings, one skilled in this art would have been able to make and use what is claimed. In sum, the specification clearly enables the full scope of the currently claimed chimeric enzymes (*i.e.*, the chimeric enzymes identified as Enzyme B (*i.e.*, SEQ ID NO: 8) and Enzyme A (*i.e.*, SEQ ID NO: 5) and the chimeric enzymes that are at least 90% identity to SEQ ID NO: 5 or SEQ ID NO: 8).

In view of the foregoing, it is respectfully submitted that the rejection has been rendered moot. Accordingly, withdrawal of the rejection is respectfully requested.

For the foregoing reasons, favorable action on the merits, including entry of the amendments, withdrawal of the rejections, and allowance of all the claims, respectfully are requested. If the Examiner has any questions regarding this paper, please contact the undersigned attorney.

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Mail Stop Amendment, Commissioner for Patents, P.O. Box. 1450 Alexandria, VA 22313-1450, on September 24, 2007.

Charles M. Avigliano

Charles M. Avigliano, Reg. No. 52,578

Respectfully submitted,

By: Charles M. Avigliano

Charles M. Avigliano
Registration No. 52,578
BRYAN CAVE LLP
1290 Avenue of the Americas
New York, NY 10104-3300
Tel: (212) 541-2000
Fax: (212) 541-4630